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AMENDMENTS TO THE CLAIMS:

The following claim listing is meant to replace all previous claim listing.

1. (Previously Presented): A recombinant DNA encoding an immunogenic fusion protein, wherein said recombinant DNA comprises a sequence (1) coding for a polypeptide heterologous with respect to a filamentous hemagglutinin of *Bordetella* (Fha) fused in the same reading frame with a sequence (2) placed upstream from said sequence (1), said sequence (2) coding for at least a part of the precursor of the Fha, this part comprising the site of interaction of the Fha with heparin, said sequence (2) being placed under the control of a promoter recognized by the polymerases of a cell transformed with said recombinant DNA and when introduced into a cell culture is expressed in said cell culture or exposed at the surface of cells, wherein said recombinant DNA is expressed as an immunogenic translational fusion protein.

2. (Previously Presented): The recombinant DNA according to Claim 1, wherein the Fha is a Fha of *B. pertussis*.

3. (Previously Presented): The recombinant DNA according to Claim 1, wherein the sequence (2) codes for a mature Fha protein.

4. (Previously Presented): The recombinant DNA according to Claim 3, wherein the sequence (2) results from truncation of the sequence coding for the mature Fha protein on its C-terminal side.

5. (Previously Presented): The recombinant DNA according to Claim 1, further comprising a sequence (3) upstream from the sequence (1), this sequence (3) consisting essentially of a truncated part of the mature protein, supplemented by the signal sequence of the precursor.

6. (Previously Presented): The recombinant DNA according to Claim 1, wherein the sequence (2) comprises excretion signals of the sequence coding for the Fha and an N-terminal domain of Fha homologous to the N-terminal domains of the hemolysins ShlA and HpmA of *Serratia marcescens* and *Proteus mirabilis*.

7. (Previously Presented): The recombinant DNA according to Claim 4, wherein the extension of the sequence (2) towards its C-terminus does not exceed the length that would no longer permit the direct excretion of the recombinant protein into the culture medium .

8. (Cancel).

9. (Cancel).

10. (Previously Presented): The recombinant DNA according to Claim 1, wherein the polypeptide encoded in the sequence (2) contains at least a specific attachment site of the Fha to the mucosa.

11. (Previously Presented): The recombinant DNA according to Claim 1, wherein the sequence (1) codes for a polypeptide having vaccinating properties against a given pathogenic agent.

12. (Previously Presented): The recombinant DNA according to Claim 1, wherein said DNA further comprises a promoter recognized by the polymerases of a cell transformable with a vector containing the recombinant DNA and allowing the expression of the sequences (1) and (2) provided that an accessory gene of fhaC is also expressed in this cell.

13. (Previously Presented): The recombinant DNA according Claim 12, wherein the promoter is a promoter recognized by the polymerases of a bacterium of the *Bordetella* species, which in the natural product regulates the expression of the Fha protein.

14. (Previously Presented): A culture of prokaryotic cells transformed by a recombinant DNA according to Claim 11, wherein the promoter of the recombinant DNA is recognized by the polymerases of said prokaryotic cells.

15. (Previously Presented): The culture according to Claim 14, wherein the cells belong to a *Bordetella* species and carry a fhaC gene expressable in these cells.

16-17: (Canceled)

18. (Previously Presented): The culture according to Claim 14, wherein the recombinant DNA is incorporated in the chromosomal DNA of said cells.

19. (Previously Presented): The culture of cells according to Claim 14, wherein the expression product of the sequence (1) is exposed at the cell surface.

20. (Previously Presented): The culture according to Claim 14, wherein the sequence (2) contains at least one attachment site for the Fha to the mucosa or to eukaryotic cells, or to macrophages or epithelial cells.

21. (Previously Presented): The culture according to Claim 20, wherein said culture is detoxified or attenuated.

22. (Previously Presented): An immunogenic composition directed against a defined pathogenic agent comprising as an active principle cells of the culture according to Claim 18 in which the sequence (1) codes for an antigen characteristic of said pathogenic agent.

23. -26: (Canceled)

27. (Previously Presented): A process for the production of a recombinant heterologous protein containing a defined polypeptide sequence comprising transforming a culture of prokaryotic cells with a vector containing a recombinant DNA according to Claim 1, said prokaryotic cells also containing a nucleotide sequence coding for FhaC which is expressed or also having been transformed, culturing said prokaryotic cells; and recovering the product excreted by the cells of this culture into their medium.

28. (Currently Amended): The process according to Claim 27, wherein said prokaryotic cells are *Bordetella*~~,~~.

29. (Previously Presented): The process according to Claim 27, further comprising purifying the excretion product by placing the culture medium in contact with heparin immobilized on an insoluble support and recovering purified recombinant protein by dissociation of the complex which said recombinant protein formed with heparin.

30. (Previously Presented): A recombinant DNA encoding a recombinant immunogenic polypeptide, wherein said recombinant DNA comprises a sequence (1) coding for an antigenic polypeptide or peptide fused in the same reading frame with a sequence (2) placed upstream from said sequence (1), said sequence (2) coding for at least a N-terminal region of the precursor of the Fha which contains the site of interaction of the Fha with heparin, said sequence (2) allowing the recombinant polypeptide, when said recombinant DNA is expressed as a translational fusion protein in a *B. pertussis* cell culture, to be secreted into the culture medium or exposed at the cell surface.

31. -33:(Canceled)

34. (Currently Amended): A recombinant DNA comprising a sequence (1) coding for a polypeptide heterologous with respect to a filamentous ~~hemmagglutinin~~ hemagglutinin of *Bordetella* (Fha) fused in the same reading frame with a sequence (2) placed upstream from said sequence (1), said sequence (2) coding for at least a part of the precursor of the Fha, this part comprising at

least the N-terminal region of a truncated mature Fha protein which contains the site of interaction of the Fha with heparin, said sequence (2), when placed under the control of a promoter recognized by the cellular polymerases of *B. pertussis* and introduced into a *B. pertussis* cell culture is expressed in this culture and excreted into the culture medium of these cells or exposed at the surface of these cells, wherein the resulting translational fusion protein facilitates the presentation of the antigen encoded by the heterologous sequence (1) to the mucosal immune system.

35. (Previously Presented): A vaccine composition for stimulating mucosal immunity comprising the cell culture according to Claim 14.

36. (Cancel).

37. (Previously Presented): A method for stimulating mucosal immunity, comprising administering nasally to a subject in need thereof a composition comprising the cell culture according to Claim 14.

38. (Cancel).

39. (Previously Presented): The recombinant DNA according to Claim 30 or 34, wherein said sequence (1) codes for an antigenic polypeptide or peptide of a pathogenic agent.

40. (Currently Amended): A culture of bacterial cells belonging to a bacterial species other than *Bordetella* and transformed by a recombinant DNA

encoding an immunogenic translational fusion protein comprising a sequence (1) coding for a polypeptide heterologous with respect to a filamentous hemagglutinin of *Bordetella* (Fha), said sequence ~~(1)being~~ (1) being fused in the same reading frame with a sequence ~~(2)placed~~ (2) placed upstream from said sequence (1), said sequence (2) coding for at least a part of the precursor of the Fha, this part comprising the site of interaction of the Fha with heparin.

41. (Previously Presented): The cell culture according to Claim 40, wherein the cells belong to the species *E. coli*.

42. (Previously Presented): The culture of bacterial cells according to claim 40 wherein said polypeptide heterologous with respect to a filamentous hemagglutinin of *Bordetella* (Fha) has vaccinating properties against a given pathogenic agent, and said part of the precursor of the Fha comprises at least the N-terminal region of a truncated mature Fha protein.